1015-35-199 **Daniela De Silva** (desilva@math.jhu.edu), **Natasa Pavlovic** (natasa@math.princeton.edu) and **Gigliola Staffilani*** (gigliola@math.mit.edu), MIT, room 2-248, 77 Massachusetts Ave., Cambridge, MA 02139, and **Nikolaos Tzirakis** (tzirakis@math.mit.edu). *Global well-posedness for the periodic 2D cubic nonlinear Schrödinger equation.*

In this talk we will present a joint work with Daniela De Silva, Natasa Pavlovic and Nikolaos Tzirakis on global well-posedness for the L^2 critical defocusing Schrödinger equation with periodic boundary conditions in 2D. We prove that the problem is globally well-posed in the Sobolev space $H^s(\mathbb{T}^2)$, for any $s > 2/3$. This result was already announced by Bourgain while discussing the possible exponent s that the method of almost conservation laws would give in this context. He also added that to obtain $s = 2/3$ his periodic bilinear estimate (or equivalently his L^4 Strichartz estimate) would suffice. When we tried to implement the estimates needed in order to carry out the method of conservation laws, we discovered that for a very particular combination of high and low frequencies, Bourgain's bilinear estimate was not enough, in fact there was an ϵ loss of regularity that couldn't be recovered. This lead us to improve Bourgain's estimate in the special case when two frequencies are not of comparable sizes. This estimate reduces to counting the lattice points on a "small" portion of a circle centered at the origin. Pick's theorem is used. (Received February 05, 2006)